Lab.1
Diode characteristic curve

Prepared by
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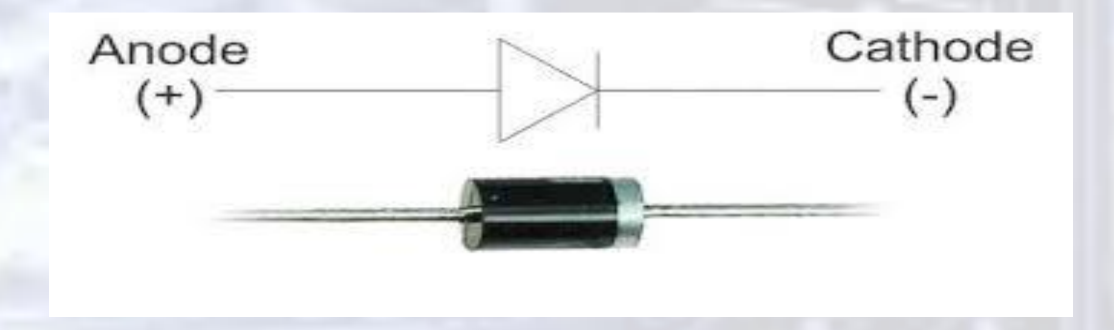
Experiment objectives

- ✓ Determining the $V_{D(on)}$ point of practical diode.
- ✓ Draw the I-V C/CS curve.

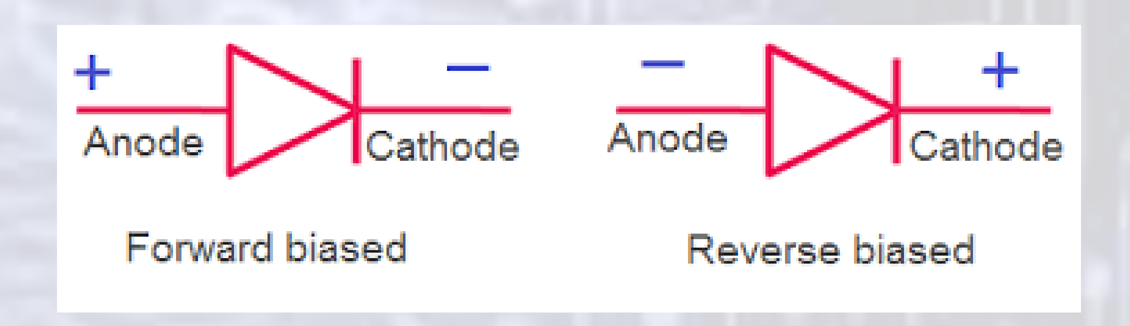
Experiment requirements

- Function generator (± 15 DC power supply).
- AVO meter.
- 1N4007 diode.
- 1 kΩ resistor.
- 470 kΩ resistor.

Diode in lab.



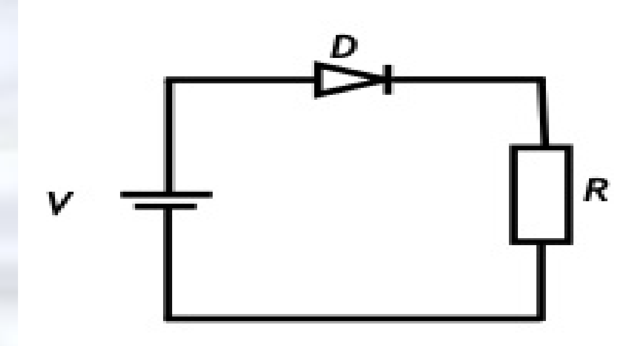
Diode connections

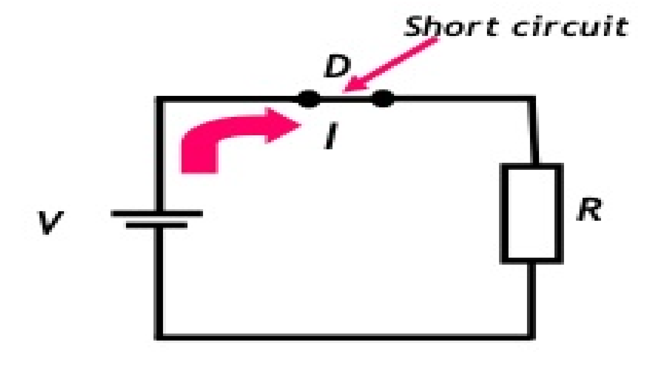


Diode models

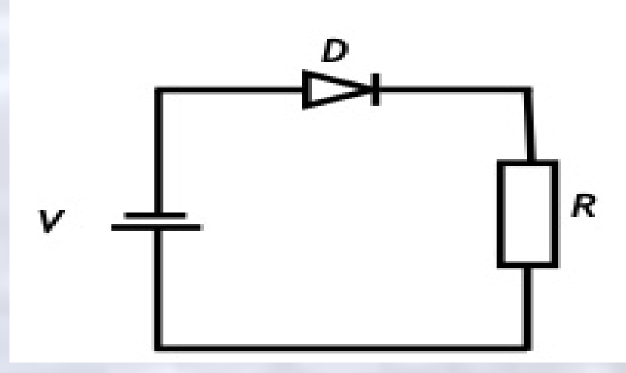
Diode Biasing

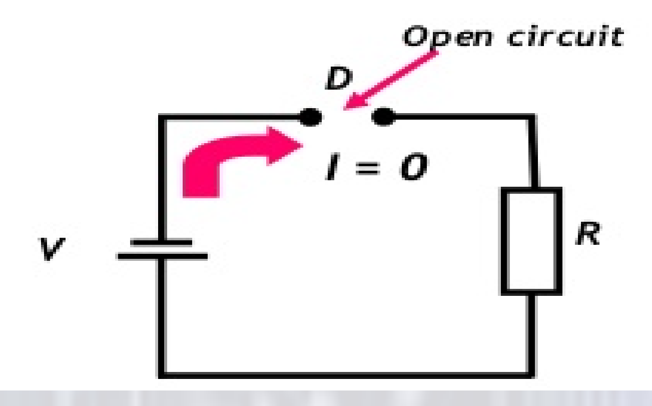
Forward Biased





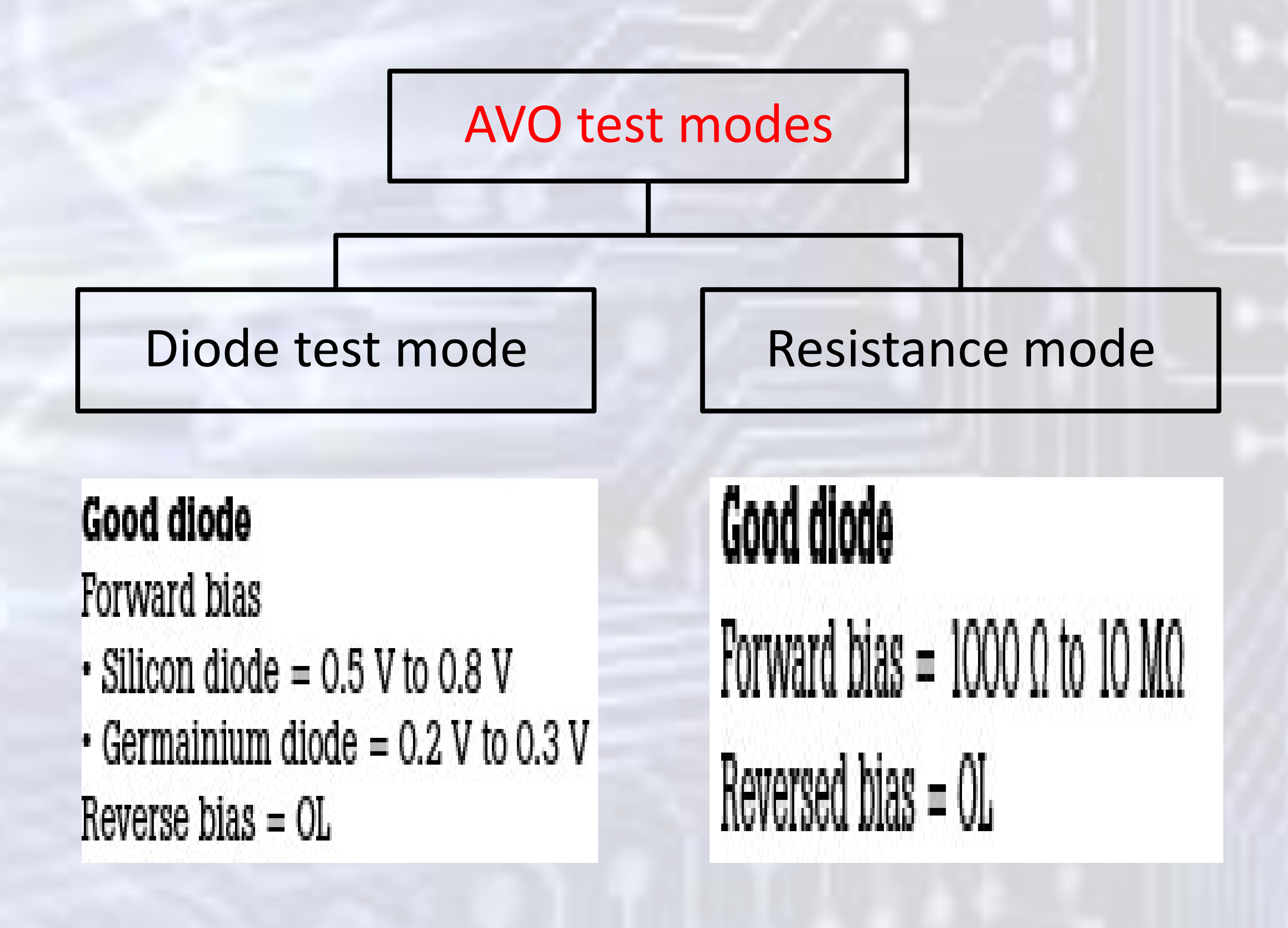
Reverse Biased





How to test diodes

Digital multimeters can test diodes using one of two methods:



Test in lab



.5867
AUTO POWER OFF
TRUE RMS
POWER
DATA
HOLD
20A
μA mA
COM
VΩHz

Diode forward bias

Multimeter-XM...
673.719 mV
A V Ω dB
Set...

XMM2
D1
1N4007
V1
15 V
R1
1.0kΩ
XMM1

Multimeter-XM...
14.326 V
A V Ω dB
Set...

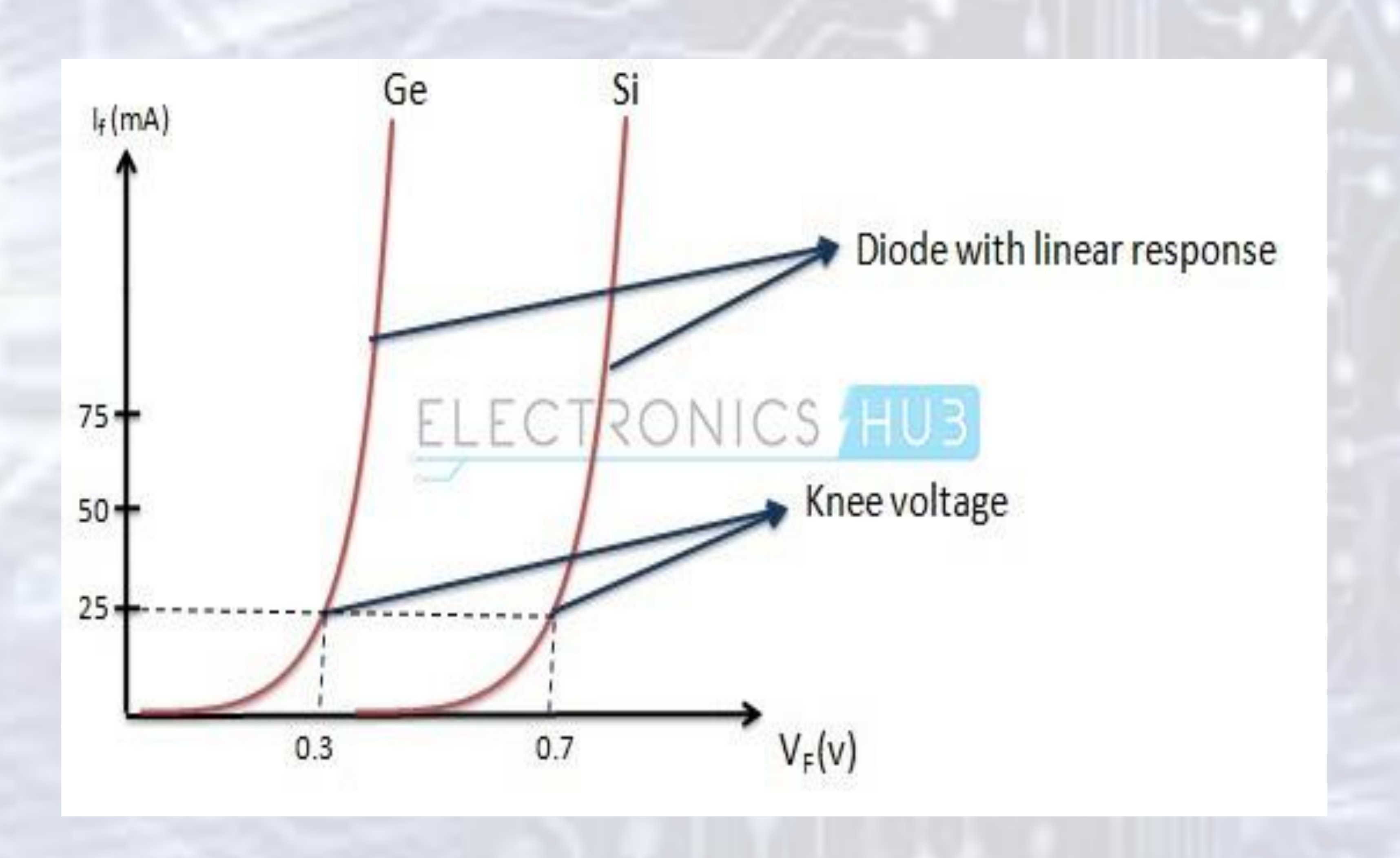
Why 1 kΩ resistor ?

Measurements in lab

E (volt)	V_{R1} (volt)	$I_D = I_{R1}$ (mA)	V_D (volt)
0.6	0.12	0.12	0.45
1.6	1.01	1.01	0.56
2.5	2.17	2.17	0.58
6.6	5.9	5.9	0.65
10.07	9.3	9.3	0.67
12.2	11.4	11.4	0.68
14.5	13.7	13.7	0.69
15.8	15.1	15.1	0.7

Knee voltage

I-V C/CS curve of forward region

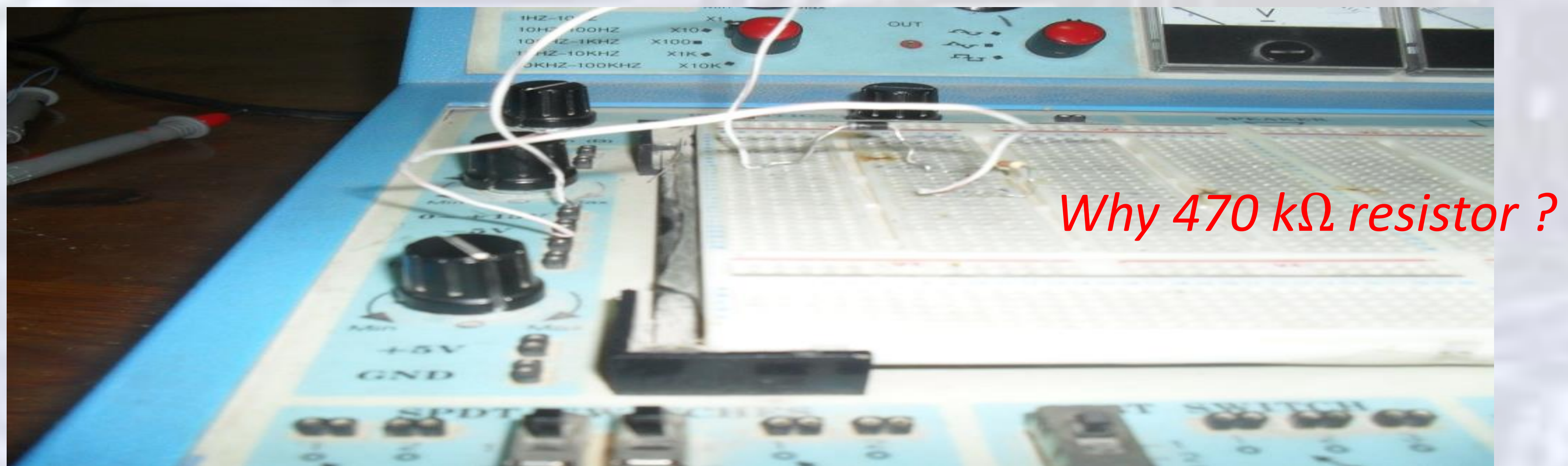


Diode reverse bias

Multimeter-XM...
14.978 V
A V Ω dB
Set...

XMM2
D1
1N4007
1 2
V1
15 V
R1
470kΩ
0
XMM1

Multimeter-XM...
22.07 mV
A V Ω dB
Set...



Why 470 kΩ resistor ?

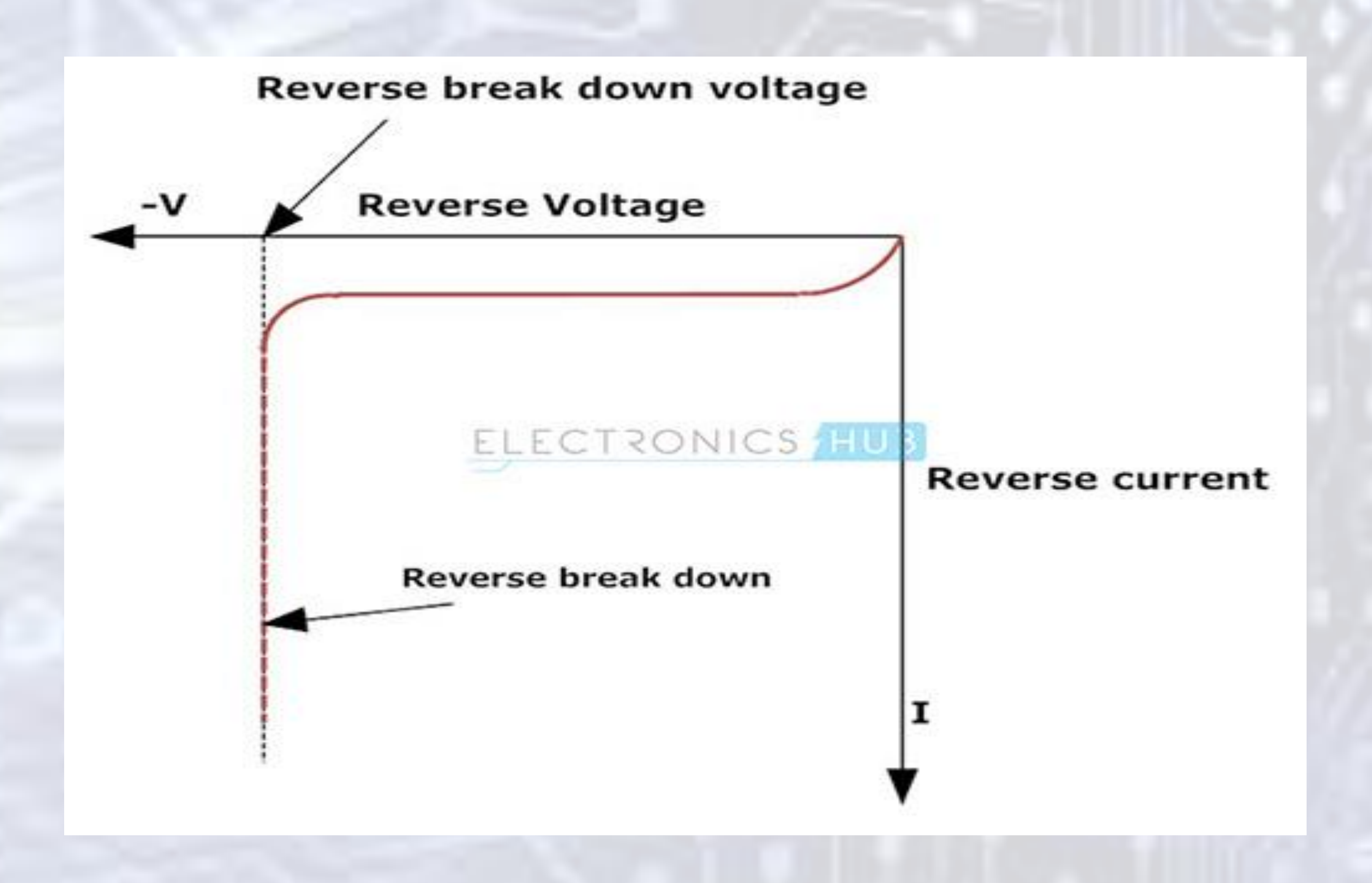
Measurements in lab

E (volt)	V_{R1} (mv)	$I_D = I_{R1}$ (nA)	V_D (volt)
-0.5	-2.6	-5.53	-0.4
-4.8	-4.1	-8.72	-4.6
-10.2	-6.4	-13.61	-9.7
-15.7	-8.6	-18.29	-15

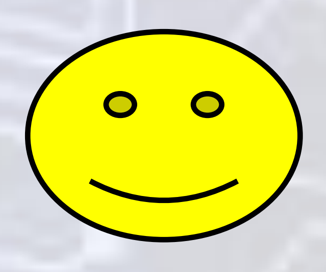
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Saturation current (I_s)

I-V C/CS curve of reverse region



Diode I-V C/CS curve



Current

Forward current

Breakdown voltage

Voltage

Leakage current

Avalanche
Current

Reverse voltage

Thank you
Any questions?